

Facility Indoor Air Quality Assessment

Kennedy Space Center, FL



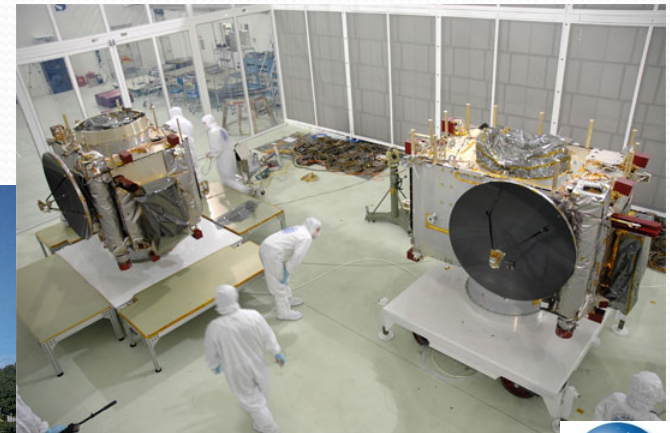
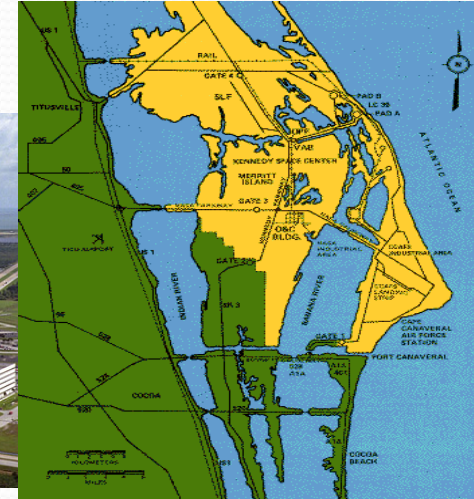
Today's Presentation

- Background
- KSC Facility IAQ Assessment Scoring
- KSC Indoor Air Quality Working Group
- Follow-up IAQ surveys



Kennedy Space Center Cape Canaveral Air Force Station

- Large workforce
- Multi-employer worksite
- Process diversity
- High temperatures & humidity



Kennedy Space Center Cape Canaveral Air Force Station

- The KSC IAQ Program has been functioning for approximately 30 years.
- KSC IAQ program outlined in KNPR 1840.19 section 3.8
- Over this period of time great improvements have been made in equipment and evaluation methods used to complete evaluations at the Space Port.



Facility IAQ Assessment Scoring

- Following heavy storm damage in 2004 our office was requested to determine an appropriate method for identifying and rating damage in facilities.
- The purpose of a score sheet was to be able to rate locations and assist in determination of where to spend money for repairs.



Facility IAQ Assessment

- An Indoor Air Quality Facility Assessment Score Sheet is completed during IAQ surveys.
- This assessment score is used by the IAQ Working group to help prioritize IAQ related work orders and is used to track the IAQ status of the facility.

Task Number	Start date	End date
Facility name & Number	Location	
Requestor	Phone	Mail Code
Contact	Phone	Mail Code

Subject	Score factor (Circle the score(s) in each column that best describes observations at the location)	Score
Reports of allergy related symptoms	Reported symptoms	5
	Documented lost work time due to symptoms	10
	Under doctor's care, allergy prescription	15
	Serious illness and/or Hospitalization required	20
Number of personnel in work area	<20	3
	20-50	6
	50-100	9
	>100	12
Housekeeping	Dust deposition Light – 1 Moderate – 2 Heavy - 3	
Visible mold • Estimated surface area.	<10 square feet surface area	4
	10-100 square feet surface area	8
	>100 square feet	12
	Visible mold growth inside HVAC system	12
Elevated humidity in work area inspected • Risk factor for mold growth • Applicable to indoor locations under HVAC • Use data from 3 to 7 days. • Sources include structural/roof leaks or from negative pressure in the facility • Note – Use maximum of 60% for areas with active water sources and/or identified visible mold is present	Above 65% for <4 hours out of every 24 hours	10
	Above 65% for <8 hours out of every 24 hours	15
	Above 65% >8 hours out of every 24 hours	20
Facility Ventilation system • Risk of subjective IAQ complaints related to HVAC • Use ASHRAE recommended temperature range. • Use ASHRAE recommended maximum CO ₂ levels	Poor air mixing – dead spots with poor air movement	2
	High or low temperatures	2
	CO ₂ >700ppm<1000ppm	4
	CO ₂ >1000ppm	6
	Dirty diffuser or debris emitted from diffuser	4
Water leaks/intrusion • Indicator of probable mold growth • Use interviews/visual inspection to identify history of water leaks from plumbing leaks, condensation on uninsulated HVAC components or other cold surfaces, structural/roof leaks • Do not include events where water is dried within 48hrs	Water leak/intrusion – single event	4
	Recurring source of moisture	8
	Recurring source of moisture – multiple locations	12
	Continuous source of moisture	16
	Continuous source of moisture – multiple locations	20
Insect/Animal/Bird infestation • Indicator of animal allergens • Use visual inspection to identify • Consult sanitarian if heavy infestation is suspected	Light to Moderate infestation	4
	Heavy infestation	8
Other -	Low concern	4
	Moderate concern	8
	High concern	12
	TOTAL SCORE =	

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KSC IAQ Working Group



- The IAQ Working Group has existed for approximately 20 years.
- The **KSC Indoor Air Quality Working Group** assists in assuring that appropriate remediation actions are taken to preserve good air quality in facilities. The working group continues to track problem facilities until appropriate remediation efforts have been completed.
- Members of the working group include:
 - Various contractor Safety & Health organizations
 - Design
 - Energy Management
 - Facilities & Shops
 - HVAC
 - Move Crew
 - Work Control
 - Industrial Hygiene
 - Medical



Follow-up IAQ evaluations



- Facilities with scores in the **severe or very high range** are re-inspected on a 6 month schedule.
- Facilities not inspected are among those that are either due for demolition or have not had remediation activities completed.
- Initially **19 facilities** were identified as being in the **Serious to Critical range** of the assessment listing.
 - Initial scores ranged between 45 and 81; avg of **53.1**.
 - Follow-up scores ranged from 4 to 65; avg of **25.1**.
- Initially **30 facilities** were identified as being in the **High to Very High range** of the assessment listing
 - Initial scores ranged between 30 and 44; avg of **36.7**.
 - Follow-up scores ranged from 1 to 76; avg of **18.2**.



Example of IAQ Working Group Minutes

March 5, 2013

Old Business:

1. **IAQ Facility Score Spread Sheet-2010:**

History: The IH group is re-evaluating every building that has been designated red (severe) or yellow (serious) on the Facility Spreadsheet since October 2009. The goal is to have IH follow up six months after the original assessment to give a status report on the progress of corrective actions. The IH Office continues to perform these follow up evaluations in between real-time work requests.

- **January Meeting:** Not many updates available for this topic due to the holiday and EH building move. L7-1557 is no longer occupied and will be removed from the list (due for demo).
- **February Meeting:** Four additional follow up evaluation have been performed. Two facilities were noted to have improved while the other two facilities still need to be addressed. Additional follow ups are in work.
- **March Meeting:** Follow up assessments continue to be performed by the IH office. Mr. Sherwood has been in contact with Mr. Brodt regarding other potential uses for the IAQ Facility Score sheet.

2. **J5-1197/SLF Tower- URS Occupant(s)- Nov. 2009:**

History: Projects included sloping the flat roof, increasing toe kicks, repairing the catwalks and sealing the roof penetrations to avoid continued water intrusion. A redundant/backup HVAC on the 4th floor weather station has not been installed yet. Mr. Broyles indicated that he is working with the facility manager to generate work orders to mitigate the ongoing issues. The design review for the 4th floor came back in February 2011. IH performed a follow up in Nov. 2011 and the remaining issues include, high humidity, a few stained ceiling tiles and water intrusion occurring in 7th floor cab possibly caused by wind driven rain

Example of Facility Assessment List

Building	Location	Date	Reported Symptoms	Number of personnel in area	House keeping	Mold growth	Elevated humidity	Ventilation system	Water leaks or intrusion	Pest infestation	Other	Total Score	Active WONS
70000	Facility	2011/11	5	3	3	8	20	4	20	0	0	63	Sheduled for Demo TBD
J8-1708	PTCR Stairwell	2011/04	5	6	3	12	20	4	12	0	0	62	Demolition Status ?
1728	1st Floor	2012/05	0	3	3	12	20	4	12	4	0	58	Demolition Status ?
M7-505D	Shipping & Receiving	2013/4	5	3	2	8	20	2	12	0	4	56	
K7-140	Facility	2012/07	0	3	1	12	20	2	8	4	0	50	
AHoF	Education Section	2013/01	0	8	3	0	20	6	12	0	0	49	
J6-1924	Facility	1012/09	0	8	3	0	20	6	12	0	0	49	
K7-569	Facility	2013/04	0	3	3	8	15	4	16	0	0	49	
M6-744	Room 134	2012/09	15	3	3	8	10	2	4	0	0	45	
J6-2377	Facility	2011/12	0	0	1	4	20	2	12	4	0	43	Demo scheduled for 2012
M7-360	Rooms 3214 & 3220	2012/10	15	12	2	0	0	6	0	0	8	43	
34702	Facility	2012/03	0	3	1	0	20	2	16	0	0	42	
54815*	Facility	2009/03	0	9	1	8	NA	0	12	0	12	42	
M6-455E	Facility	2013/01	0	6	0	12	0	0	12	8	0	38	
90302	Room EC-101	2013/04	0	3	2	4	20	4	0	0	0	33	
M7-505	Rooms 1231, 1232, 1244	2012/06	5	3	1	4	0	4	19	0	0	33	
K6-848	C Tower Stairwell	2010/11	0	0	0	8	20	0	0	4	0	32	
M6-744	Room 162	2012/04	0	3	1	4	20	0	4	0	0	32	
K6-794	Wing 1000	2012/11	5	6	0	8	0	0	12	0	0	31	
M6-493	West Entry	2013/04	5	6	0	8	0	0	8	0	4	31	
K6-1896	Facility	2013/02	0	3	3	0	0	0	0	0	12	30	Currently under Refurbishme nt
M6-409	Room 1404	2011/05	5	3	1	4	0	0	12	4	0	30	
M6-595D	Facility	2013/03	0	3	1	0	0	2	12	0	12	30	

• Questions?

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